Mount Diablo Astronomical Society

Diablo MoonWatch

February 2013

NEW LOCATION

GENERAL MEETING

Tuesday February 26, 2013

The search for life on other planets

with an update from the Mars Curiosity Rover

By Dr. Chris McKay

Doors open at 6:45 p.m.
Lindsay Wildlife Museum
1931 First Avenue,
Walnut Creek, CA 94597

Please park West of the museum, follow the instructions on the last page

The Mars Curiosity Rover has been operating on Mars for over 200 days.

Chris Mckay will review the current status on the search for organics in the soil and the prospects for determining the habitability of the site. If we find organics on Mars, the next challenge will be to determine if they are of biological or non-biological origin. There are other worlds in the Solar System that are also of keen interest in the search for life: a favorite is Enceladus, a small moon of Saturn.

Dr. Christopher P. McKay is a Planetary Scientist with the Space Science Division of NASA Ames.

Chris' current research focuses on the evolution of the solar system and the origin of life. He is also actively involved in planning for future Mars missions including human exploration. Chris has been involved in research in Mars-like environments on Earth, traveling to the Antarctic dry valleys, Siberia, the Canadian Arctic, and the Atacama, Namib, & Sahara deserts to study life in these Mars-like environments. He was a co-investigator on the Huygens probe to Saturn's moon Titan in 2005, the Mars Phoenix lander mission in 2008, and the current Mars Science Laboratory mission (2012).

MDAS Outreach Program

by Jim Head

With a great year of participation behind us, and another busy year scheduled, here are a few thoughts on why our members are in demand to setup telescopes and activities during school science nights and public events, and why we feel motivated to contribute our time, effort, and expense, to help out.

Sharing the wonder of the Universe with others is a marvelous experience.

Most of us realize how fascinating it is to learn about our Universe, some would say this knowledge could be fundamental to our existence, yet few students are taught much about the Universe until 8th grade. By that late age, only the surviving curious of a faulty education system will realize the wonder around them. Too many students plod through the 4 week course without learning how exhilarating our extended environment truly is – not only outer space but inner space as well. Having lost their

(Continued on page 6)

WHAT'S UP

Collecting Meteorites can be a rewarding experience, it's a great feeling just to hold one in your hand, but there's much more to the story… learn about it at this month's what's up. . .

by Jim Head

President's Corner

Looking at Stars as They Really Are

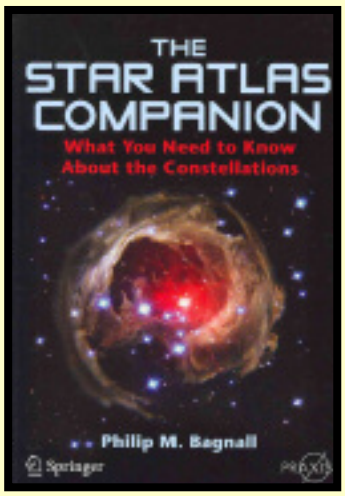
by Chris Ford

This month I will review a book that I thought was one of the best astronomy books published in 2012. Admittedly, that is an unashamedly personal opinion as there are many to choose from, but so informative and refreshingly different in its approach was this book, that I unhesitatingly recommend it to any member of the MDAS who is interested in understanding any of the most commonly observable stars as they physically really are.

Most of us have one or several star atlases, and as visual astronomers we use the stars to identify the constellations and other asterisms, as directional pointers to locate deep sky objects, to align our telescopes, and in some cases to observe directly, especially if they are double or multi-star systems, strikingly colored, or constituent components of star clusters or nebulae. However despite their intrinsic beauty and appeal, it is also true to say that many of us spend more time looking at galaxies, nebulae, and other objects, that lie between the stars. We most often use individual stars themselves as reference markers without often thinking about their true physical properties. I am of course primarily referring to visual astronomy and not the well established specialized study of stars through CCD camera photometry. There are many books on stars available, but most are focused on the astrophysics and usually only highlight the classic or most famous examples of each type. Where this book completely changed this authors perspective is in the way it describes well over 1,000 stars in the night sky as actual 3-dimensional objects of varying distance and of widely differing characteristics rather than points of light, and makes them real and relevant.

Entitled The Star Atlas Companion by Phillip M. Bagnall.

This book is not a conventional star atlas at all, but rather focuses on the physical properties of a very large number of observable stars, including their size, distance, shape, color, variability, motion, and even whether extra-solar planets have been detected.



The Star Atlas Companion by Philip M Bagnall from Springer Praxis

Though encyclopedic in scope and incredibly dense with information, the writing style is informal, interesting to just dip into and browse randomly, and is very up to date. Bagnall is an amateur astronomer himself and writes for a non-academic audience, though the information that is presented is so comprehensive that it is as useful a general reference for any astronomer.

Organized alphabetically by constellation, the constituent stars of each are exhaustively described in order by all their physical characteristics. This might might seem rather dry reading, but the author has an easy conversational writing style that is quite engaging, and the real stand out feature of the book is in the way it diagrammatically shows in true scale the relative distance, size and shape of each star compared with the sun and the solar system, and how unbelievably variable in size some of these stellar objects are. For example, the Northern constellation Cepheus easily visible in the February night sky, boasts several super giant stars and several hyper giants that are so large, that superimposed on the solar system they would stretch almost to the orbit of Saturn. Many of the best known stars, Vega is a good example, are not even spherical but rather elliptical in shape from their rapid rotational speed. Other stars have mottled surfaces or vary in brightness from the poles to the equator depending on the physical properties that are annunciated in the text. The sheer variety of stellar properties is really bought home in this book and enables you to make a direct connection with each example, by simply going outside and looking up it. This is a good companion to have in the field.

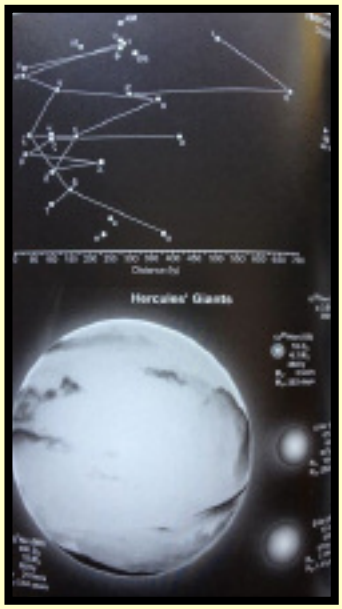
Looking at Stars as They Really Are *(Continued from the previous page)*

Another wonderful feature of the book is that the TRUE distance of the stars in each constellation is illustrated as if viewed "from the side" ranked by distance from earth.

The result of course is that almost all constellations that from the Earth appear to be made up of stars in the same part of space, are in fact nothing of the sort. A constellation as famous as the Big Dipper consists of stars that are as close as under 50 light years and as far away as over 450 light years. Stars that are dim because of their great distance turn out to be vastly larger and brilliant than our Sun. Conversely, some of the brighter nearby stars in the sky are modest by comparison. Distance is a property that is often hard to relate to when observing the stars in any one area of the sky, almost as if they were pasted on the inside of a large sphere. To bring it home and show the real context, Bagnall presents diagrams for each constellation comparing the apparent magnitude of each star as viewed from Earth with their real absolute magnitude as if they were all viewed from a standard distance of 35 light years, (10 parsecs) which shows a very different picture.

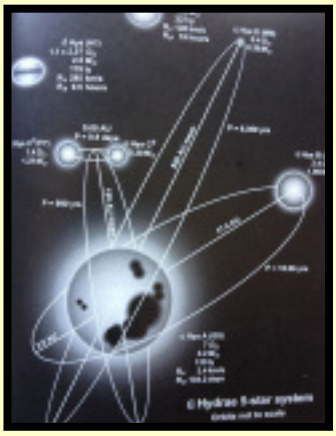
A sample page from The Star Atlas Companion illustrating the size of Cepheus supergiant stars by their diameter (in solar diameters) mass (in Suns) distance, rotational speed, temperature, and more.

Equally fascinating is how complex some multiple star systems are. The orbital mechanics of triple, quadruple, and even higher, stars, is not easily understood without diagrams, and Bagnall's book helps in several celebrated examples. The pages illustrated in this review are just a small sample, and every constellation presents multiple diagrams like this. The only work required of the reader is that the greek alphabetic star designations re used for reasons of space and brevity, so brushing up on your alpha, beta, gamma etc, symbols is useful. For my personal reference, I just photocopied the greek alphabet out of the forward of the book and used it as a book mark for instant reference in case I mixed up my tau's with my sigma's.



A page showing the true distance of each of the stars in Hercules measured in Light Years.

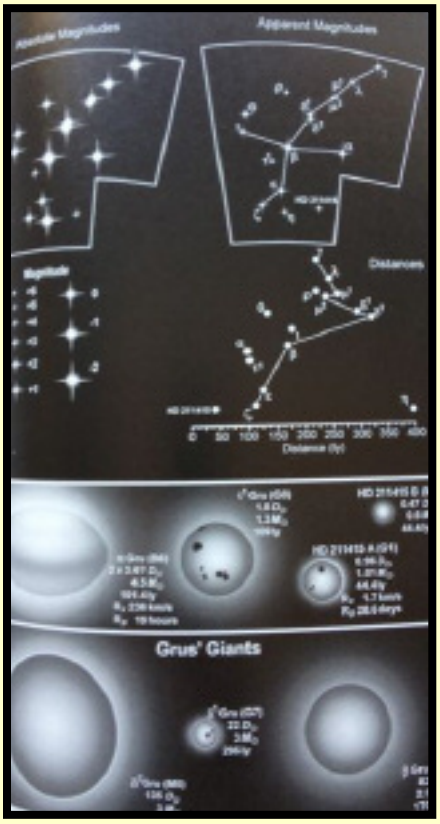
One final characteristic of the book is its insight into how the positions of the stars and the shapes of constellations will evolve over time. The movement of many stars through space is described, many are moving in odd orbits around and in the milky way galaxy, and the sky will look increasingly different as the millennia progress. All constellations in the Northern and Southern hemisphere are given equal treatment, and the result is a book that covers almost all of the brightest and more prominent stars visible to the naked eye, and inspires one to learn just a bit more about those points of lights that we too often use as reference points before moving on to the Messier's and NGC's..



Diagrammatic illustration of the 5-star Epsilon Hydra star system.

It is occasionally said that visual astronomy is as much a pursuit of the mind and imagination as it is of the eye. Over this winter I observed many of the stars in this book and read about their true properties, sizes, and dis-

Looking at Stars as They Really Are *(Continued from the previous page)*



A typical page from the Star Atlas companion.

tance. Doing so really bought home the real physical characteristics of these objects, not points of light but real stars like the Sun. Feeling streams of photons from these stars directly touching my retina that in turn create electrical signals my brain can interpret, gives a very real sense of direct connection to both the star in question and the Universe in general. I have not found any other resource that collects so much interesting information about the observable stars in such a detailed yet readable format. Recommended as a supplement to your astronomy library and available in paperback from Springer Praxis:

http://www.amazon.com/Star-Atlas-Companion-Constellations-Astronomy/dp/1461408296

And Finally...

By all accounts our first society night in January at the Lindsay Wildlife Museum was a great success with many MDAS members commentating on the excellence of the venue. It was also our most attended evening for some while. Not unexpectedly, there were some minor teething problems with the lights and existing audio equipment that the MDAS board is working to address, but all in all we have a great new home and we all look forwards to many more evenings to come.

Clear skies!

Chris Ford

It's Membership Renewal Time!

Renew your MDAS membership and your magazines online!

Annual Membership Dues of $25 Are due by April 1, 2013 for members on the April membership cycle.

To renew your club membership, you may either:

• Renew online using Paypal or your credit card at: http://mdas.net/mdas_store.html, select Membership Renewal. On the same web page, please consider making an additional MDAS or MDOA donation of $10 or $15 to further support our club and our observatory, even $5 would be highly appreciated.

• Or you may mail a check for $25 (or more!) made payable to the M.D.A.S. to the following address:
Mount Diablo Astronomical Society
P.O. Box 4889
Walnut Creek, CA 94596

MAGAZINE SUBSCRIPTION RENEWALS

All Sky & Telescope and Astronomy magazine subscriptions renewals are handled online **at the club discount rate!**

The Astronomical Society of the Pacific has made arrangements with these magazines to allow members of the NASA Night Sky Network to renew at the club discount rate. All you need is to

login to the Night Sky Network (NSN) through our club.

You can log into Night Sky Network and go to the Magazine Subscriptions and Links page to find the "New and Renewal Subscriptions" link: http://www.astrosociety.org/magazine/

You may also simply renew by mail directly with the magazine using your renewal notification. Any questions, please email memberinfo@mdas.net or call Marni Berendsen at 925-930-7431.

Carina Nebula Pillar

Hubble Captures View of "Mystic Mountain"

To mark the 20th anniversary of Hubbies launch and deployment into Earth orbit, NASA and the Space Telescope-Science Institute issued this stunning image.

Thenew photograph is reminiscent of a craggy fantasy mountaintop surrounded by wispy clouds. The image captures the chaotic activity on a three-light-year-tall pillar of gas and dust that is being eaten awav by the brilliant light from nearby colossal young stars. Those massive stars are located above the pillar off the image.

Streamers of hot ionized gas can be seen flowing off the ridges of the structure, and thin veils of gas and dust, illuminated by starlight, float around its towering peaks.

Scorching radiation and fast winds (streams of charged particles) from the gigantic young stars in the nebula are shaping and compressing the pillar, causing new stars to form within it.

The new stars buried inside the pillar are firing off jets of gas that can be seen streaming from towering peaks. This turbulent cosmic pillar lies within a tempestuous stellar nursery called the Carina Nebula, located 7,500 light years away in the southern constellation Carina.

The Carina Nebula is one of the largest and brightest nebulas in the sky. The nebula is home to some very massive stars, several times heftier than the Sun. One of those giant stars is Eta Carinae, which is 100 times more massive than the Sun and about 4 million-times brighter. Eta Carinae is one of the brightest stars known and one of the most massive stars in the Milky Way Galaxy.

Close-up view of Carina Nebula Pillar

This image reveals long jets of gas shooting in opposite directions of tthe tip of a giant pillar of material. The jets are a signature of new star birth. The young star cannot be seen because it is buried deep inside the dense pillar. The jets are launched by a swirling disk of gas and dust around the young star. The disk dumps material onto the star. The star then heats up the material and eventually ejects it.

Credit: NASA, ESA, and M. Eivio and the Hubble 20th Anniversary Team (STScI)

IONIZED:

Atoms that have been converted to ions by removing or adding electrons. In astronomy, atoms are usually ionized when electrons are removed from neutral atoms, creating positive ions.

MDAS Outreach Program *(Continued from the first page)*

curiosity, it's no wonder many California students have poor science comprehension when compared in national and international studies. Much of the adult population could remain ignorant of the Universe they live in too.

Why is this so?

In 2001 when the No Child Left Behind Act was signed into law, it created the unintended consequence of giving science instruction a much lower priority in elementary schools. Surprisingly, in many schools it simply doesn't exist. Two years ago SF Bay Area teachers reported they deserve an F for the lack of science teaching in elementary

schools, primarily because of the NCLB act. As a result, schools concentrate on English Language Arts and Math, accounting for 52% and 34%, respectively, of a school's API score; Science at 6% is often considered unnecessary! At an astronomy night at one of the lower income Title-1 schools (where funding is increased), when I asked the teachers if my pre-stargazing talk should reinforce where they were with their teaching of science, they replied, smiling, "Science? There is no science instruction on this campus. We're lucky if there's time for math, but there's never time for science."

Other reasons elementary schools do a poor job of teaching science are; 1) elementary school teachers seldom enter the field with science in mind, 2) there is little or no support to provide science training for these teachers, and 3) most college teacher preparation programs do not provide instruction that align with current science standards. As a result, the lack of emphasis on science permeates throughout the entire elementary school system. One gleaming example, most of these schools prohibit all extracurricular activities, including astronomy nights, during the 2-4 week standardized testing period, which is usually at the end of April or the first part of May. It's often said schools don't want students to be confused with the facts that were drilled into them in the weeks leading up to the test.

There are many problems created as a result of the NCLB act, but there is another issue that has nothing to do with the NCLB, and yet it could be the largest problem in education today. It has to do with the very nature of how we teach. No two people are alike, and with over seven billion individuals on this planet, students are treated the same regardless of their individual ability. It is well known, with an increasing population, there's increased diversity. Then why move them lockstep together for twelve years, without consideration of individual performance? How is it that students are forced to advance to the next unit of instruction, when they clearly demonstrate a lack of understanding of the prerequisite unit? It is no wonder why so many students appear lost by the time they enter middle school. In this digital age it appears that schools are decades behind in adopting relevant curriculum. There is hope, however, in a new program called "Blended Learning" where students learn at their own pace, comprehension is vastly improved, and education can be tailored to the individual. This method of teaching could provide quality learning opportunities for advanced and challenged learners alike, and could eliminate many of the problems in our educational system. I wonder what it would involve or how long it would take to implement in the state of California.

In this curiosity-starved, science-neglected educational system, it is a good thing to have a transparent atmosphere. If we could tolerate the living conditions on smoggy Titan or Venus, the clouds would block out the

MDAS Outreach Program *(Continued from the previous page)*

night sky, we wouldn't be able to see much of the Universe, and we would probably not progress well as a species! Fortunately, here on Earth one can easily observe the Universe. We are able to look up in fascination and witness the wonderment of it all. That is until the gross proliferation of artificial light spoiled our experience. When was the last time you heard a student in the city remarking about the Universe? Do they have any concept of where they are? With the light pollution we are experiencing the effect is as if we were on a cloud-shrouded planet.

It amazes me every time a student looks up into the light polluted sky in complete awe after what they just saw through the eyepiece, and said, "WOW, that's up there? It doesn't look real, it looks like a picture!" When living under light-polluted skies, every child should have the opportunity to look through a telescope and wonder, "What is this big thing called the Universe?"

There are many ways to share some of the wonders of the Universe with others. Often it's as easy as showing the moon or one of the large planets using a simple telescope, or just holding a meteorite in your hand and explaining where it came from. When you spark curiosity, a window opens for young imaginations to wander wildly. With a little imagination one can visualize the explosion of neurons firing in their brains.

Altogether there are many reasons to participate in our outreach program; here are a few other benefits:

1) The MDAS and its members belong to the NASA-sponsored Night Sky Network, and much of the Night Sky Network educational material is integrated into the programs we offer.

When you contribute your time and effort at these events you are part of a much larger, well-coordinated effort. Thanks go to Marni Berendsen, among others, at the Astronomical Society of the Pacific, for developing and implementing the Night Sky Network. Since 2004, over 23,000 events have been logged from 400 astronomy clubs in the USA and over 2.4 million folks have attended!!!

2) Setting up a telescope in the field will increase your working knowledge of telescopes, mounts, and other telescope-related astronomy activities.

This gives you an opportunity to try different setups to serve multiple goals, among them providing a quality first-time experience for new observers, and being prepared shortly after sundown when students are lined up waiting their turn. There are helpful astronomy activities available that work alongside the telescope, enriching the experience of both observer and operator.

3) Exercise! Loading your equipment into the car, then unloading to setup, standing for one or two hours, then packing it into the car again, and then unpacking again when home, this increases flexibility. It's a light workout, as they say, "Use it or lose it!"

Most of our outreachers setup telescopes, but we are receiving requests for other astronomy activities as well. When a stargazing event is concurrent with a school's science night, some of our members enjoy setting up an

MDAS Outreach Program

(Continued from the previous page)

activity in the Multi-Purpose Room. During daylight hours, activities associated with the Sun can be demonstrated, and work well with a solar filtered telescope. I encourage everyone to learn a few of the astronomy activities at the Night Sky Network activity search page at https://nightsky.jpl.nasa.gov/download-search.cfm .They cover a diverse selection of astronomy topics, there are hundreds to choose from, and many have videos or tutorials to show how they can be demonstrated. If you need assistance using the inquiry form, shoot me an email.

Last year there was great participation; 51 members volunteered at one or more of our 47 events, 29 volunteered for at least 5 events. This year is likely to be busy, and we could use your help! It's easy to get involved. Simply join the Outreach Group on the Night Sky Network to receive an email for upcoming events, and signup where you can.

Here are many of the members who contributed to our programs during 2012, we are lucky to be part of a great team.

THANK YOU!!!

Marni Berendsen
Tom Boltz
Jack Borde
Ken Coates
Robert & Pam Cowart
Ken DeSilva
Chris Ford
Stuart Foreman
Rene Gandolfi
Rich Girard
Doug Grebe
Mike Harms
Jim Head
Steve & Linda Jacobs
Randy John
Ralph Lambert
Mike Lewis
Rick Linden
Robert Minor
Chris Peterson
Richard Ozer
John Read
Paul Reid
Ralph Requa
Kent Richardson
Wil Roberge
Vianney
Mark Stafforini
Moon Trask
Nick Tsakoyias
Marv Weaver
Jon Wilson

Advancements in science and technology have enriched the lives of many people on this planet. Our educational systems have the responsibility to prepare our youth for a productive life amid globalization and increasingly diverse interests. Science and math are universal languages. They can bridge cultures and promote peace. Science is a top priority for most countries; they realize their future depends on a scientifically literate population. Here in the USA we often hear administrators say how important science should be, however, seldom is there constructive action. Too many school systems in the USA today do not support any astronomy–related instruction.

Won't you join the effort this year? Help us spark curiosity in young and older-young minds, and introduce them to the wonder that exists all around them. Here are some of the upcoming events scheduled for this Spring where you can participate:

Event Name Start Date

San Ramon Parks Stargazing 2013-02-15
Pittsburg Library Stargazing 2013-02-19
Hidden Valley Science Fair 2013-02-21
Oakley Elementary stargazing 2013-02-28
Timber Point Elementary Stargazing 2013-03-04
Hillview Junior High School Stargazing 2013-03-06
Cambridge Elementary Science Night 2013-03-13
Public Astronomy Program, Mt. Diablo 2013-03-16

Mount Diablo Astronomical Society Event Calendar–February 2013

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
27	28	29	30	31	1	Society Observing (Private) 2 Sunset: 5:35 PM
3	4	Westwood Stargazing (Private) 5	6	7	8	Society Observing (Private) 9 Sunset: 5:44 PM
10	Board Meeting (Private) 11	12	13	14	6:30 PM San Ramon Parks Stargazin 15	16 Sunset: 5:51 PM
17	Washington's Birthday 18	6:30 PM Pittsburg Library Astro 19	20	Hidden Valley's Science (Private) 21	22	10:00 AM Docent Training Session 23 Sunset: 5:59 PM
24	25	7:15 PM GenMtg: Curiosity on Mars 26	27	Oakley Stargazing (Private) 28	1	2

One Club Member Volunteer Needed

PUBLICITY COORDINATOR:

Description: Contact local media outlets to publicize our monthly meetings and club events. Steve Jacobs (llasjacobs@astound.net) will provide you with more information and everything you need to get started.

How much time does it take? Four to eight hours a month.

Who do I contact? Contact our President, Chris Ford (cford81@comcast.net) 213-272-6306, to register your interest.

Board Members & Address

President
Chris Ford - cford81@comcast.net

Vice President
Rick Linden - Rick.C.Linden@gmail.com

Membership Coordinator, Mtg Room
Marni Berendsen - berendsen@aol.com

Meeting Program Chair
Dick Flasck - rflasck@aol.com

Outreach Coordinator, AANC Rep
Jim Head - jamesnhead@comcast.net

Publicity Board Member
TBD

Observing Committee Chair, Board Member
Richard Ozer - rozer@pacbell.net

Whats Up Coordinator, Board Member
Kent Richardson - kayarind@sbcglobal.net

Treasurer
Will Roberge - wil@donahue.com

Newsletter Editor
Vianney - veloroute@hotmail.com

Webmaster
Jon Steel - jonlee0483@aol.com

Secretary
Moon - metallicamoon@sbcglobal.net

New Member Steward
Nick Tsakoyias - claytonjandl@aol.com

Mailing address:
MDAS
P.O. Box 4889
Walnut Creek, CA 94596-3754

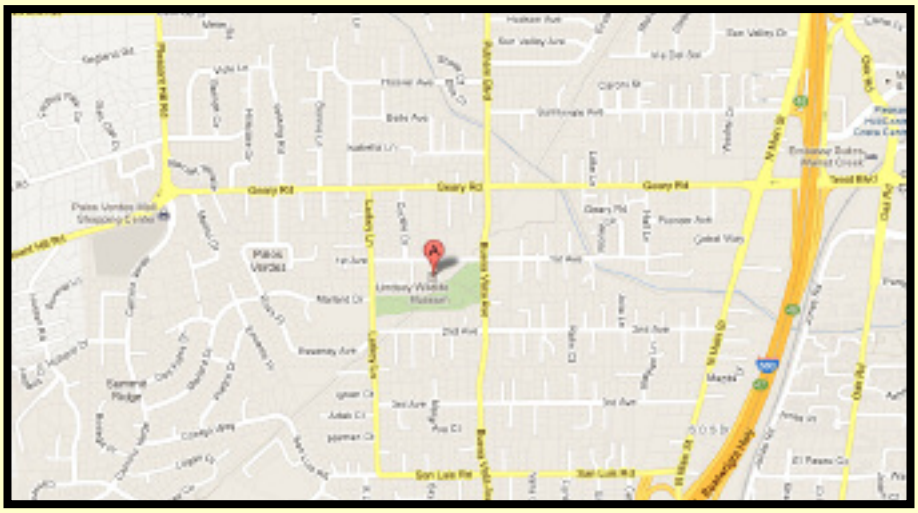
General Meetings:
Fourth Tuesday every month, except on the third Tuesday in November and December. Refreshments and conversations at 6:45 pm; Meeting begins at 7:15

Where:
Lindsay Wildlife Museum
1931 1st Avenue
Walnut Creek, CA 94597
(925) 935-1978
wildlife-museum.org.

Directions to facility:
From the North: Take 680 South to Treat Blvd. exit. Turn left at light onto North Main St. Turn right on Geary Road. Turn left on Buena Vista. Turn right on First Avenue. The museum is halfway up the block on the left.

From the South: Take 680 North. Take the Treat Blvd./Geary Road exit and turn left over freeway. Go three more lights and turn left on Buena Vista. Turn right on First Avenue. The museum is halfway up the block on the left.

Parking:
The museum is located in a residential area. There are no parking fees nor meters. Please park only in the museum parking lots on the east side of the museum, the Friends Church lot across the street (except Sunday mornings) or on Buena Vista Avenue. Please do not park on First Avenue in front of our neighbors' homes — you will get a parking ticket.



Scopes Are Needed!

Friday, February 15, 2013—6:30 p.m.- 8:00 p.m.
San Ramon Parks Stargazing, Old Ranch Park, San Ramon, CA Setup 5:30 p.m.

Tuesday, February 19, 2013—6:30 p.m.- 8:00 p.m.
Pittsburg Library Stargazing, Pittsburg Public Library, Pittsburg, CA Setup 5:30 p.m.

Thursday, February 21, 2013—6:30 p.m.- 8:30 p.m.
Hidden Valley Science Fair, Hidden Valley Elementary School, Martinez, CA Setup 5:00 p.m.

As Always: Writers Wanted

We are always looking for new articles and content. If you have astronomical perspectives or experiences to share with your fellow members that you would us to consider, please feel free to contact me Chris (cford81@comcast.net) or our newsletter editor Vianney. (veloroute@hotmail.com)

Clear skies! *Chris and Vianney*